

# Generative-Discriminative Feature Representations for Open-Set Recognition

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## Abstract

We address the problem of open-set recognition, where the goal is to determine if a given sample belongs to one of the classes used for training a model (known classes). The main challenge in open-set recognition is to disentangle open-set samples that produce high class activations from known-set samples. We propose two techniques to force class activations of open-set samples to be low. First, we train a generative model for all known classes and then augment the input with the representation obtained from the generative model to learn a classifier. This network learns to associate high classification probabilities both when image content is from the correct class as well as when the input and the reconstructed image are consistent with each other. Second, we use self-supervision to force the network to learn more informative features when assigning class scores to improve separation of classes from each other and from open-set samples. We evaluate the performance of the proposed method with recent open-set recognition works across three datasets, where we obtain state-of-the-art results.